Photo: Eurac Research/Annelie Bortolotti

USE CASE

Medical tests over several days

Test the effects of extreme altitude

terra X cube

eurac research

Use case / Rev. 1 / Feb. 2024

terraXcube

terraXcube is Eurac Research's extreme climate simulation center at the NOI Techpark in Bolzano, South Tyrol, Italy. Within its chambers, even the most extreme environmetal conditions on our planet can be created. By combining hypobaric and altitude technology with state-of-the-art environmental simulation, we aim to investigate the effects of extreme climate conditions on humans, ecological processes and industrial products. The climate chambers differ in size and equipment and can accommodate people, plants and other living organisms for up to extended periods and have the space to accommodate large machines and products. Each day our team breaks new ground with scientists and industry partners and prepares the path to gain discoveries.

Photo: Eurac Research/Marina Baldo

Hypoxia is a lack of oxygen in the blood which can occur at extreme altitude and can lead to the impairment of physical and cognitive abilities.

In terraXcube's Large Cube, medical tests lasting several days can be carried out on groups of people exposed to extreme altitudes whilst maintaining lifestyle habits such as diet, water intake, physical activity and day-night rhythms. This makes it possible to observe and analyze the isolated effects of extreme altitude on the organism. The simulation of extreme altitude can be achieved by two methods: first, by reducing the atmospheric pressure, and by reducing oxygen content at normal pressure.

In our Large Cube we can also extend the simulation of extreme altitude to include the simulation of extreme weather phenomena. This makes it possible to test physical reactions at extreme altitudes at a specific outdoor temperature or humidity level. Due to pressure equalization locks and a sanitary area, the Large Cube is suitable for medical testing, even over for extended periods of up to several days.

In addition to simulating extreme weather phenomena and extreme altitudes of up to 9000 meters, long-term tests of up to several days are also possible in the Large Cube. The maximum number of participants for each test is 15.

The test in a nutshell:

High altitude | Oxygen | Day and night | Flights and climbs | Test development

Measures:
The interior dimensions of the Large Cube are 12 m × 6 m × 5 m (L x W x H). The total available area is 137 m² plus 100 m² for test set-up. The entrance to the test chamber is formed by a wing gate with the dimensions: 3.6 m × 4 m (W x H). The maximum size of the test object can be 10 m x 3.6 m x 4 m (L x W x H).

Accredited tests:
Tests accredited by Accredia according to the following standards:
CEI EN 60068-2-1:2007, IEC 60068-2-1:2007
Environmental testing: Cold
CEI EN 60068-2-2:2008, IEC 60068-2-2:2007
Environmental testing: Dry heat
IEC 60068-2-13:2021 Environmental testing:
Low air pressure,
IEC 60068-2-39:2015, CEI EN 60068-2-39:2016
Environmental testing: Temperature and low air pressure

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Technical data:

Temperature: -40...+60°C
Relative humidity :10 % – 90 %rH
Maximum simulated altitude: 9000 m
Air pressure: 95 kPa – 33 kPa
Wind: 0 m/s – 30 m/s

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